



Moffett Federal Airfield Superfund Site — Site 25

Moffett Field, California

July 2001

U.S. NAVY ANNOUNCES PROPOSED PLAN

The U.S. Navy, in cooperation with the U.S. Environmental Protection Agency (U.S. EPA), and the San Francisco Bay Regional Water Quality Control Board (RWQCB), is requesting public comments on several proposed actions being considered to remedy a wetlands area at former Naval Air Station, Moffett Field (Moffett Federal Airfield).

This **Proposed Plan*** announces the U.S. Navy's preferred **cleanup** remedy for the Eastern Diked Marsh and the stormwater retention pond, known as Site 25, at Moffett Federal Airfield. The U.S. Navy proposes to address impacts on sediment at Site 25 by:

- Removing the top 1 foot of **sediment** in areas where chemical concentrations are above the limits considered safe for non-**piscivorous** (non-fish eating) birds, which are considered the most sensitive ecological **receptors** likely to be present at Site 25, given site uses.
- Transporting excavated sediments off-site to an appropriate disposal facility.
- Conducting confirmation sampling of sediment and surface water after **excavation** to ensure that the remedy has been completed according to the guidelines established in the **Record of Decision (ROD)**.
- Re-establishing and improving the habitat by covering the excavated areas with clean soil and sediment, creating a streambed for freshwater flow, and revegetating the excavated and disturbed areas.
- Enacting "**institutional controls**" to ensure that the site continues to be used for flood control, as it has been since 1953, and that use of the site by non-piscivorous birds and other ecological receptors remains the same. These will include: 1) ensuring that seasonal drying, which helps maintain the protectiveness of the remedy, is not disrupted; and 2) maintaining the existing sediment **settling basin** to ensure that the remedy remains effective.
- Performing a 5-year review to verify that the remedy continues to operate and function as designed.

The Proposed Plan includes summaries of all the cleanup alternatives that were evaluated by the U.S. Navy, the **U.S. Environmental Protection Agency (U.S. EPA)**, the San Francisco Bay Region of the **California EPA Regional Water Quality Control Board (RWQCB)**, and the National Aeronautics and Space Administration (NASA), and explains the U.S. Navy's basis for choosing the **Preferred Alternative**.

* Words in bold type can be found in the glossary beginning on page 14.

— Notice —

**30-day Public
Comment Period**
July 23 - August 22,
2001

Public Meeting
August 16, 2001

Mountain View
City Council Chambers
6:30 p.m.

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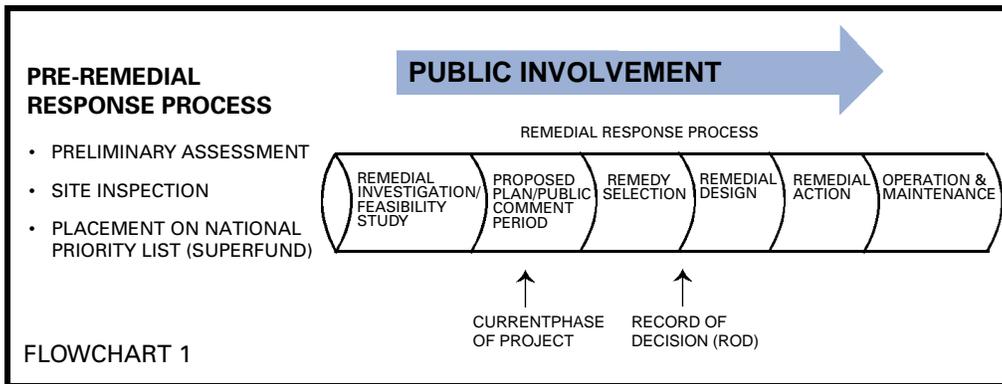
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THE SUPERFUND PROCESS

The U.S. Navy is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the **Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)** and Section 300.430(f)(2) of the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**, commonly known as the “**Superfund**” program. Superfund enables U.S. EPA to respond to hazardous waste sites that threaten public health and the environment. Flowchart 1 below illustrates the current position of Site 25 in the Superfund process.

This Proposed Plan summarizes information detailed in the **Remedial Investigation/Feasibility Study (RI/FS)** Reports and other documents contained in the **Administrative Record** file for this site. The U.S. Navy encourages the public to review these documents to gain an understanding of Site 25 and the environmental assessment and investigation activities that have been conducted.

The Superfund Process



The documents are available for public review at the locations listed on the back page of this Proposed Plan.

A 30-day public comment period will be held from July 23, 2001 to August 22, 2001 to

receive written and oral comments on this Proposed Plan. A public meeting will be held on August 16, 2001 at the Mountain View City Council Chambers beginning at 6:30 p.m.

In consultation with the regulatory agencies, the U.S. Navy may modify the Preferred Alternative or select another remedy based on feedback from the community or on new information. Therefore, the community is strongly encouraged to review and comment on all of the cleanup alternatives, including the U.S. Navy's preferred remedy. A final decision will not be made until all comments are considered.

FACILITY HISTORY

Moffett Federal Airfield, formerly known as Naval Air Station (NAS) Moffett Field, is located 35 miles south of San Francisco, 10 miles north of San Jose, and approximately 1 mile south of San Francisco Bay (see Figure 1, Location Map, below). The facility encompasses about 2,200 acres in Santa Clara County, California. NAS Moffett Field was operated by the U.S. Navy from 1933 to

1935 and again from 1942 to 1994. The Army Air Corps operated the facility from 1935 to 1942. The facility initially supported the West Coast dirigibles (blimps) of the lighter-than-air program and later was used in a variety of aviation-related capacities, which included transport, training, and anti-submarine/patrol activities. NAS Moffett Field was closed as an active military base in July 1994.

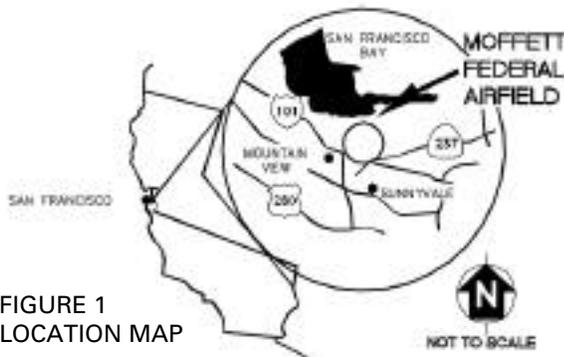


FIGURE 1
LOCATION MAP

NASA now operates Moffett Field as Moffett Federal Airfield. The site was placed on the National Priority List (NPL) in 1987. A **Federal Facility Agreement (FFA)** signed by the U.S. Navy, U.S. EPA, and the State of California was enacted on September 14, 1990. The FFA identifies the U.S. Navy's responsibility as the **lead agency** for investigation and cleanup of chemicals resulting from past Navy activities. In 1984, the U.S. Navy began environmental assessments and investigations at Moffett Field. These activities identified various sites that posed potential risks to human health and the environment.

SITE DESCRIPTION

This Proposed Plan pertains specifically to the Eastern Diked Marsh and stormwater retention pond, which are located in the northwestern part of Moffett Federal Airfield (see Figure 2, Site Map, on the next page). These areas are part of the facility's stormwater drainage system. The Eastern Diked Marsh and stormwater retention pond consist mainly of wetland habitat, with minor areas of seasonal upland habitat. The Eastern Diked Marsh is seasonally saturated but rarely covered with fresh stormwater. The stormwater retention pond is seasonally covered by 1 to 5 feet of stormwater, but is usually dry in the late summer and fall. The Eastern Diked Marsh functions as an upland habitat during late summer and fall, but provides wetland habitat during other seasons. The area is currently covered with a mixture of salt-tolerant plants such as pickleweed and other species such as cattails. The marsh provides habitat for several species of insects including mosquitoes, damselfly nymphs, and midge fly larvae. Pickleweed and widgeon grass grow on the shoreline of the stormwater retention pond, and blue-green algae grow in the pond. The Eastern Diked Marsh and stormwater retention pond also provide habitat for bird feeding and nesting. Both water fowl (for example mallard ducks and American coots) and shorebirds (for example black-necked stilts, American avocets, and dowitchers) feed or nest there.

The area receives runoff from approximately 1 square mile of predominantly paved industrial area. Prior to 1991, there was no mechanism to remove sediment from stormwater before it entered the wetlands. This resulted in potential environmental risks from the sediments, which were identified during various environmental assessments as summarized in this Proposed Plan. Stormwater now drains via underground conduits to a stormwater settling basin (see Figure 3, Site Plan, on page 5), which was constructed by NASA in 1991 to remove sediment prior to the water entering the wetland. From the settling basin, the water flows overland northward through the Eastern Diked Marsh to the stormwater retention pond.

REMEDIAL INVESTIGATION SUMMARY

From 1993 to 1996, the U.S. Navy conducted remedial investigations (RIs) in the Site 25 area under U.S. EPA's and the RWQCB's oversight. During these investigations, the ecology and the nature and extent of contamination at Site 25 were evaluated. Preliminary ecological investigations indicated that the Eastern Diked Marsh and the stormwater retention pond areas were populated by various types of plants and animals that are common to wetland habitats, including salt-tolerant plants, waterfowl, shorebirds, rodents, and various types of invertebrates (insects, worms, etc.). To investigate the nature and extent of contamination at the site, sediment samples were collected along a grid encompassing the entire area of the Eastern Diked Marsh and the stormwater retention pond. Co-located surface water samples were also collected at many of the sediment sampling locations. These samples were analyzed for a variety of chemicals of potential concern, including **polychlorinated biphenyls (PCBs)**, organochlorine pesticides, metals, **volatile organic compounds (VOCs)**, **semivolatile organic compounds (SVOCs)**, and **total petroleum hydrocarbons (TPH)**. The RI indicated that chemicals, including PCBs, pesticides, metals, and TPH, were detected in surface water and/or sediment samples collected within Site 25 wetland areas at levels that require further cleanup activities.



RISK SUMMARY

Information from the chemical analysis was used to assess potential risks to both humans and other ecological receptors (plants and animals) for various exposure scenarios at the site. This involved conducting site-specific human health and ecological **risk assessments**, in which the following items were identified:

- Chemicals of Concern (chemicals present at the site that may contribute to the majority of risk)
- Potential human and ecological receptors (who and what might be at risk)
- **Exposure pathways** (how the chemicals could reach human and ecological receptors)
- Potential health impacts (how the receptors might be affected if the chemicals reached them)

The RI concluded that there were areas within Site 25 that may pose risk to human health and to ecological receptors. However, because the cleanup requirements for ecological receptors (which currently populate the

site) are also protective of human health, the risk to ecological receptors was identified as the **driving risk** for the site, and is therefore the focus of the response action.

Human Health Risk Scenarios

To fully protect humans and the environment, the U.S. EPA has developed conservative methods for estimating the potential human health risks caused by exposure to chemicals. Risks are calculated based on the types and concentrations of chemicals present, and on possible exposure pathways to these chemicals. Three risk scenarios were initially considered at Site 25. These three scenarios consisted of Residential (housing), Recreational (hiking, canoeing, bird watching), and Occupational (employment facilities and work areas). Only the recreational and occupational scenarios were considered relevant as discussed below.

Residential Risk Scenario — Residential use is not expected at the Eastern Diked Marsh or the stormwater retention pond. This is because: 1) the site is expected to be used for stormwater control as it has for the last 50 years; and 2) the site has been designated a wetland by the U.S. Department of Fish and Game, which restricts development of the area. Furthermore, if in the future the site were to be developed, fill would be deposited on the sediments, and exposure would thus be very unlikely. For these reasons, it was determined that the potential for residential exposure to sediments at the site is very remote. Once it was determined that no one would live on the site, the risk to residents was not further evaluated.

Recreational Risk Scenario — Because the Eastern Diked Marsh offers limited recreational use, only the stormwater retention pond was evaluated for risk to recreational users. In accordance with U.S. EPA protocols, the human health risk assessment included evaluation of both carcinogenic (cancer-causing) and non-carcinogenic risks. Results from the human health risk assessment indicated that risks associated

with the recreational scenario (maximum carcinogenic and non-carcinogenic [total hazard index] risks were 2.1×10^{-5} and 0.4, respectively) are within the range generally considered acceptable by U.S. EPA. The cleanup goals established to protect ecological receptors are expected to reduce risks to recreational users even further.

Occupational Risk Scenario — Occupational use at the Eastern Diked Marsh and stormwater retention pond consists of maintenance of the settling basin, sample collection, and wildlife surveys. For the

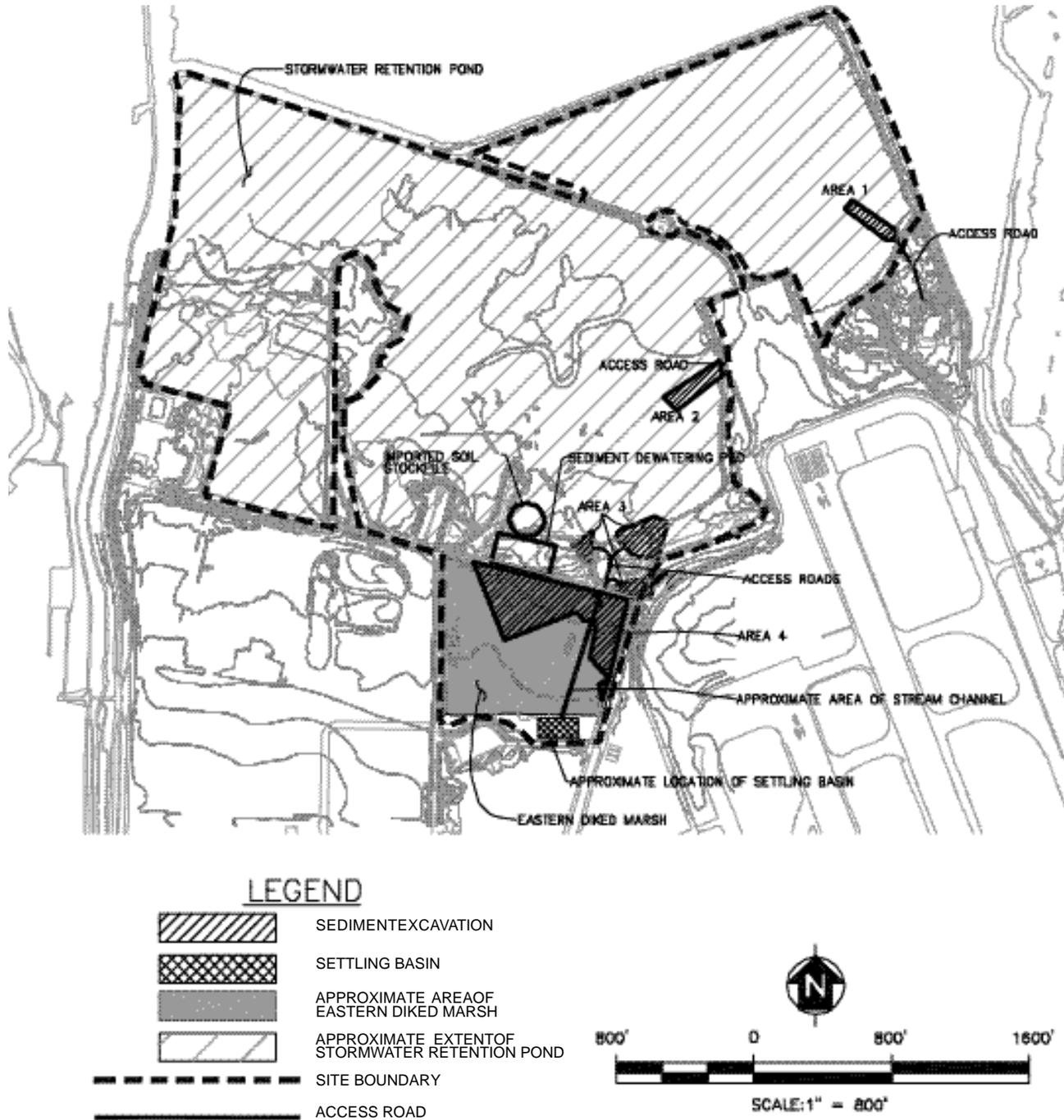


FIGURE 3
SITE PLAN

occupational risk scenario, unacceptable carcinogenic and non-carcinogenic risk was identified in some areas of the Eastern Diked Marsh and stormwater retention pond (maximum carcinogenic and non-carcinogenic [total hazard index] risks were 6.0×10^{-4} and 8.6, respectively). It should be noted that the occupational risk assessment was very conservative. Workers were assumed to be exposed to chemicals at the stormwater retention pond and Eastern Diked Marsh for eight hours per day, 250 days per year over the course of 25 years. According to administrative sources at NASA, this is an overestimate of worker exposure. The risks associated with the occupational risk scenario are thus likely to be overestimated. Therefore, ecological receptors were determined to be the most sensitive receptor at the site. The cleanup goals established to protect ecological receptors are more conservative than U.S. EPA Region 9 preliminary remediation goals for the protection of occupational workers. Hence, remedial alternatives that address risk to ecological receptors will also address the areas presenting potential occupational risk.

Ecological Risks

Potential risks to ecological receptors were assessed based on exposure to the chemical concentrations at the site. The ecological risk assessment included evaluation of exposure to both surface water and sediments. For the surface water evaluation, risks were calculated using U.S. EPA's ambient water quality criteria as well as laboratory tests. In the laboratory tests, laboratory organisms (algae, crustaceans, and fish) were exposed to surface water samples from the site and analyzed to see how they were affected. The analysis suggested that the surface water poses little or no risk to ecological receptors at Site 25.

For the sediments, the most sensitive ecological receptors are piscivorous (fish eating) birds. However, due to the limitation of fish habitat caused by seasonal drying, fish comprise a negligible component of the diet of birds present at the site. Therefore, sediment risks were evaluated based on the black necked stilt (a shore bird) and the mallard duck (a waterfowl). Assessment of chemical levels that would be protective of these indicator species would also be protective of other ecological receptors, given the insignificance of piscivorous birds at the site.

The evaluation indicated that there is a potential for risks to ecological receptors due to exposure to chemicals in sediments. The chemicals identified as being present in the sediments at levels that contributed to the majority of risk included total PCBs, lead, zinc, and total DDT (dichlorodiphenyltrichloroethane; total DDT refers to a mixture of the chemical forms of DDT, as well as several breakdown products).

FEASIBILITY STUDY

A Revised Final Station-Wide **Feasibility Study** was prepared in September 1999. The final documentation for the Feasibility Study is presented in the Revised Final Responses to Comments on the Revised Final Stationwide Feasibility Study Report, submitted in March 2001. The Remedial Action Objectives (RAOs; summarized in the following section) and three remedial alternatives identified for the site are presented in the March 2001 final documentation of the Feasibility Study. The remedial alternatives were evaluated against nine criteria as required by CERCLA regulations. A description of the nine evaluation criteria is provided in Table 1 on the next page. Following is a summary of the RAOs, and the remedial alternatives that were evaluated for their ability to meet these objectives and address impacted sediments at Site 25.

TABLE 1. NCP Criteria for Superfund Remedial Alternatives

U.S. EPA uses nine criteria to evaluate alternatives for cleaning up a hazardous waste site. The nine criteria are as follows:

Overall Protection of Human Health and the Environment

determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

Compliance with ARARs

evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

Long-term Effectiveness and Permanence

considers the ability of an alternative to maintain protection of human health and the environment over time.

Short-term Effectiveness

considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.

Reduction of Toxicity, Mobility, or Volume through Treatment

evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Implementability

considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

Cost

includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate with a range of +50 to -30 percent.

State Acceptance

considers whether the State agrees with the Navy and U.S. EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan (this criterion is evaluated after receiving agency comments on this Proposed Plan).

Community Acceptance

considers whether the local community agrees with U.S. EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance (this criterion is evaluated after receiving public comments on this Proposed Plan).

REMEDIAL ACTION OBJECTIVES

The overall RAO of this response action is to limit the exposure of ecological receptors to chemicals in sediments in the Eastern Diked Marsh and stormwater retention pond. This will involve reducing the concentrations of total PCBs, lead, total DDT, and zinc in shallow sediments to levels that are protective of sensitive ecological receptors. As part of the risk management process, these levels were defined as follows:

- PCBs: 470 micrograms per kilogram (µg/kg)
- Lead: 148 milligrams per kilogram (mg/kg)
- Total DDT: 166 µg/kg
- Zinc 454: mg/kg¹

The RAO complies with the NCP and CERCLA requirements.

¹ Additional analyses would be conducted before the cleanup action begins to verify that the RAO for zinc is low enough to protect water quality in the area. The RAO for zinc may be modified based on results of the analysis. If modification is necessary, 164 mg/kg would be used as a lower bound value.

SUMMARY OF REMEDIAL ALTERNATIVES

Remedial alternatives for Site 25 are presented below. Three alternatives were evaluated as potential remedies for the impacted sediment at Site 25. A brief summary of the three remedial alternatives is provided in Table 2 on page 11.

Alternative 1 — No Action

Estimated Capital Cost: \$0

Estimated Total Operations & Maintenance (O&M) Cost: \$0

Estimated 30-Year Total Cost: \$0

Under Alternative 1, no cleanup action would be implemented, and no monitoring would be conducted. Regulations governing CERCLA require that the "no action" alternative be evaluated to establish a baseline for comparison with other alternatives involving remedial action. Under this alternative the site would be left in its current condition.

Alternative 2 — Excavation and Off-Site Disposal

[Preferred Alternative]

Estimated Capital Cost: \$1,972,800

Estimated Total O&M Cost: \$590,000 (includes total cost for post-revegetation ecological monitoring and 5- year review. NASA will, by agreement, incur costs associated with settling basin maintenance)

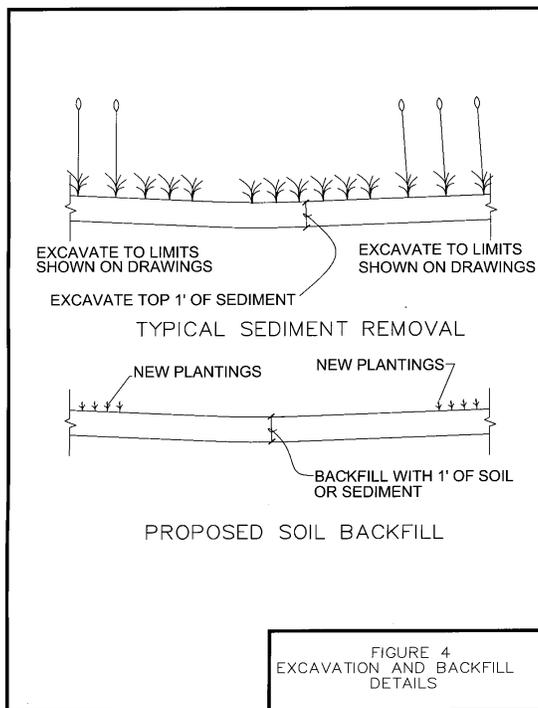
Estimated 30-Year Total Cost: \$2,562,800

Alternative 2 is sediment removal and off-site disposal. In areas where chemical concentrations are higher than the proposed RAOs, the top 1 foot of sediment would be removed. Based on current information, areas that may require excavation are shown in Figure 3, Site Plan, on page 5.

An important part of Alternative 2 is that additional sediment testing would occur prior to excavation to refine the extent of contamination in the areas where excavation may be needed (see Figure 3), and to reduce the uncertainty associated with the data collected during the remedial investigation. The additional sediment testing serves two purposes: 1) to determine the amount of sediment to be removed,

and 2) to minimize impacts to the natural habitat by removing only impacted sediment. Overall, this means that only sediment with chemical concentrations greater than RAOs would be removed. Excavation will be performed during the dry season, when standing water is not present at the site. Prior to excavation, the proposed excavation area would be evaluated to determine if **threatened and endangered species** are present. Appropriate minimization/avoidance measures would be incorporated into the project to minimize the effect of excavation on threatened and endangered species. A Storm Water Pollution Prevention Plan specific to the construction activities would be developed prior to implementation of the remedy.

Access to the excavations would be provided through a temporary access road constructed as shown on Figure 3, Site Plan. Access roads would be constructed using Best Management Practices to minimize impacts to the area. Upon completion of the excavation activities, the access road would be removed using Best Management Practices and the road material would be tested and disposed of as required by law. A typical sediment excavation/backfill is shown in Figure 4, Excavation and Backfill Details, above.



Following excavation, samples would be collected to confirm that the impacted sediments have been removed and that RAOs have been met. Excavated sediments would be tested, transported, and disposed of off-site at an appropriately permitted facility as required by law.

All sediments would be dewatered as required at the location shown on Figure 3, Site Plan, prior to transport off-site utilizing Best Management Practices to minimize impacts to the area. Sediment would be placed on an elevated platform inside a bermed and lined containment cell that allows the sediment to drain. The drained liquid would be transferred into the appropriate storage containers, sampled, and disposed of as required by law. Imported soil would be stockpiled as shown on Figure 3, Site Plan, prior to being transported by truck via the access road to the excavation areas.

Once the excavation was complete the habitat would be re-established. This would be done by first placing 1 foot of clean soil or sediment in the excavated areas. The type of soil or sediment would be carefully selected to be similar to the existing sediment. Efforts would be made to obtain soil or sediment that was generally free from noxious weeds. The clean backfill would be transported in trucks in accordance with a transportation plan to be developed as part of the remedial design. Next, a small water channel between the Eastern-Diked Marsh and stormwater retention pond would be created to allow for the flow of water. The purpose of creating this channel is to provide improved habitat for bird feeding and nesting. Then, wetland plant species would be reintroduced based upon a revegetation plan that would be prepared. A trained wetland biologist would be present to monitor all onsite construction activities.

Alternative 2 also includes institutional controls to ensure the protectiveness of the remedy to ecological receptors. This would involve making sure that the area continues to dry seasonally, which helps prevent fish from inhabiting the pond. The reason for use of institutional controls is that the proposed RAOs for the pond may not protect piscivorous birds from PCBs that could bioaccumulate in fish. It is noted that more conservative RAOs were not established because: 1) the RAOs are protective of ecological receptors and humans given site uses; 2) approximately 95% of the total PCB mass would be removed by excavating to the proposed RAOs; 3) the incremental increase in destruction of wetland habitat would have been disproportionately large in relation to the additional contaminant mass that would be removed if lower RAOs were established; 4) the site currently provides wetland habitat and is used by numerous shorebirds and waterfowl, especially during high tide in the Bay; and 5) the recovery time of the wetland habitat following remediation is unknown and may be lengthy according to wetland experts. It is further noted that seasonal drying may not occur during a particularly wet year or period of years. Such events, however, have been sporadic in the past, and thus would not be expected to impact the long-term effectiveness of the remedy.

This work will also require that NASA continue use of a Storm Water Pollution Prevention Plan. NASA currently conducts stormwater sampling under a National Pollutant Discharge Elimination System permit, and uses Best Management Practices to control stormwater entering the site. Furthermore, a sediment settling basin is in place to prevent impacted sediment from again reaching the Eastern Diked Marsh and stormwater retention pond. These measures will help to ensure that the remedial action remains effective and the habitat remains suitable for birds and other wildlife.

Finally, the 5-year review process would be used to address performance of the remedy, including monitoring and evaluating the effectiveness of the institutional controls. The review would focus on assessing: 1) whether the remedy is functioning as intended; 2) if the ecological risk assumptions used at the time are still valid; and 3) if any new information may call into question the protectiveness of the remedy.

Alternative 3 — Excavation, Ex-Situ Bioremediation, and On-Site Reuse or Off-Site Disposal

Estimated Capital Cost: \$2,299,200

Estimated Total O&M Cost: \$590,000 (includes total cost of post-revegetation ecological monitoring and 5-year review)

Estimated 30-Year Total Cost: \$2,889,200

Alternative 3 is sediment removal, treatment of the sediment via **ex-situ bioremediation** (on-site cleanup of the removed sediments), and on-site reuse or off-site disposal, depending on chemical concentrations after treatment. Excavation would be performed during the dry season, when standing water is not present at the site. As with Alternative 2, samples would be collected and tested before and after sediment removal. The samples collected prior to excavation would be used to determine the amount of sediment to be removed, and to reduce the level of uncertainty associated with the existing data. The samples collected after excavation would be used to confirm that the impacted sediments have been removed and that RAOs have been met (refer to Figure 3 on page 5 for areas that may require excavation). A Storm Water Pollution Prevention Plan specific to the construction activities would be developed prior to implementation of the remedy. Prior to excavation, the proposed excavation area would be evaluated to determine if threatened and endangered species are present. Appropriate minimization/avoidance measures would be incorporated into the project to minimize the effect of the project on threatened and endangered species.

Access to the excavations would be provided through a temporary access road constructed as shown on Figure 3, Site Plan. Access roads would be constructed using Best Management Practices to minimize impacts to the area. Upon completion of the excavation activities, the access road would be removed using Best Management Practices and the material tested and disposed of as required by law. Sediment would be placed on an elevated platform inside a bermed and lined containment cell that allows the sediment to drain. The cell would be constructed utilizing Best Management Practices to minimize impacts to the area. The drained liquid would be transferred into the appropriate storage containers, sampled, and disposed of as required by law. Imported soil would be stockpiled as shown on Figure 3, Site Plan, prior to being transported by truck via the access roads to the excavation areas.

Excavated sediments would be treated biologically in a temporary on-site treatment unit using naturally occurring microorganisms. These organisms “eat” certain chemicals, and this would serve to reduce PCB and DDT concentrations. Biological treatment would not lower metals concentrations. After treatment, the sediment would be tested to evaluate whether chemical concentrations are low enough to allow reuse at Moffett Federal Airfield or if it must be disposed of off-site.

Once the excavation was complete, the habitat would be re-established. As with Alternative 2, this would be done by first placing 1 foot of clean soil or sediment in the excavated areas. The type of soil or sediment would be carefully selected to be similar to the existing sediment. Efforts would be made to obtain soil or sediment that was generally free from noxious weeds. The clean backfill would be transported in trucks in accordance with a transportation plan to be developed as part of the remedial design. Next, a small water channel between the Eastern-Diked Marsh and stormwater retention pond would be created to allow for the flow of water. The purpose of the channel would be to provide improved habitat for bird feeding and nesting. Then, wetland plant species would be reintroduced based upon a revegetation plan that would be prepared. A trained wetland biologist would be present to monitor all onsite construction activities.

Institutional controls would also be enacted to ensure the protectiveness of the remedy to ecological receptors. This would involve making sure that the area would not be changed to prevent seasonal drying, which normally occurs, and is needed to prevent fish from inhabiting the pond. The reason for this is that the proposed RAOs for the pond may not protect piscivorous birds from PCBs that could bioaccumulate

in fish. Furthermore, as noted under Alternative 2, more conservative RAOs were not established because: 1) the RAOs are protective of ecological receptors and humans given site uses; 2) approximately 95% of the total PCB mass would be removed by excavating to the proposed RAOs; 3) the incremental increase in destruction of wetland habitat would have been disproportionately large in relation to the additional contaminant mass that would be removed if lower RAOs were established; 4) the site currently provides wetland habitat and is used by numerous shorebirds and waterfowl, especially during high tide in the Bay; and 5) the recovery time of the wetland habitat following remediation is unknown and may be lengthy according to wetland experts. It is also noted that seasonal drying may not occur during a particularly wet year or period of years. Such events, however, would be expected to occur sporadically, and thus should not significantly impact the long-term effectiveness of the remedy.

This work will also require the continued use of a Storm Water Pollution Prevention Plan. NASA currently conducts stormwater sampling under a National Pollutant Discharge Elimination System permit, and uses Best Management Practices to control stormwater entering the site. Furthermore, a sediment settling basin is in place to remove sediment prior to it entering the area. These measures are intended to ensure that the remedial action remains effective and the habitat remains suitable for wildlife.

The 5-year review process would be used to address performance of the remedy, including the effectiveness of the institutional controls. The review would focus on assessing: 1) whether the remedy is functioning as intended; 2) if the ecological risk assumptions used at the time are still valid; and 3) if any new information may call into question the protectiveness of the remedy.

TABLE 2. Summary of Remedial Alternatives for the Eastern Diked Marsh and Stormwater Retention Pond

RI/FS Designation	Description
Alternative 1	No action
Alternative 2	Removal of impacted sediment, dewatering sediment, transporting excavated sediments off-site, revegetating the natural habitat, enactment of institutional controls, maintaining the sediment settling basin, performing a 5-year review to verify that the remedy continues to operate and function as designed.
Alternative 3	Removal of impacted sediment, ex-situ bioremediation, on-site reuse or transporting excavated sediments off-site, revegetating the natural habitat, enactment of institutional controls, maintaining the sediment settling basin, performing a 5-year review to verify that the remedy continues to operate and function as designed.

EVALUATION OF ALTERNATIVES

As specified in the NCP, nine criteria are used to evaluate the remediation alternatives individually and against each other in order to select a preferred cleanup remedy. A description of the nine evaluation criteria is provided in Table 1, on page 7. This section of the Proposed Plan profiles the relative performance of each alternative against seven of the nine criteria, noting how it compares to the other options under consideration (see Table 3 on page 14). The other two criteria, state and community acceptance, will be evaluated after the public comment period and will be addressed in the ROD. The "Detailed Analysis of Alternatives" can be found in the final documentation for the Feasibility Study and other site documents.

Overall Protection of Human Health and the Environment

Alternative 1 (No Action) would not protect human health and the environment because impacted

sediments would remain in place and the potential for exposure would not be reduced. For this reason, Alternative 1 is not considered further in this analysis as an option for this site. Alternatives 2 and 3 would both protect human health and the environment by removing the upper 1 foot of impacted sediments and replacing them with clean soil or sediments. Removal of 1 foot of sediment is ecologically protective based on: 1) the decrease in chemical concentration with depth; 2) the shallow root zone within the wetlands area of approximately 0.5 feet; and 3) the elimination of potential ecological pathways with the replacement of excavated areas with clean fill. This would meet the RAO identified for the site (limiting exposure of ecological receptors to impacted sediments by reducing the chemical concentrations in shallow sediment to protective levels). Alternatives 2 and 3 are therefore considered acceptable from this aspect of the comparison.

Compliance with ARARs

Applicable or Relevant and Appropriate Requirements (ARARs) from federal and state laws and regulations were evaluated for each alternative. As presented below, both Alternatives 2 and 3 comply with ARARs.

In designing excavation activities for both alternatives, the substantive requirements of the Rivers and Harbors Act, the Coastal Zone Management Act, the federal Endangered Species Act, the California Endangered Species Act, Clean Water Act, National Historic Preservation Act, and the California Fish and Game Code would be considered. Best Management Practices would be used to prevent construction pollutants from contacting stormwater and to minimize erosional products from moving off-site in accordance with the substantive requirements of State Water Resources Control Board Order 97-08 and 40 Code of Federal Regulations (CFR) Parts 122, 123, and 124. Appropriate controls would also be taken to minimize dust during excavation in accordance with Bay Area Air Quality Management District Regulation 6-301. Once excavated, the sediment would be sampled and analyzed to evaluate whether the material should be managed as hazardous waste pursuant to California Code of Regulations (CCR) Title 22 Section 66261-66268 and CCR Title 23 Section 2521, or as a designated waste as defined in CCR Title 27 Section 20210. Under Alternative 2, an appropriate off-site disposal facility would be selected based on this analysis.

For Alternative 3, additional ARARs would be required. Sediment would be temporarily contained in a **Corrective Action Management Unit** as described in CCR Title 22 Section 66264.552 that would comply with PCB storage requirements in 40 CFR Section 761.65. Treatment of sediment would be conducted in a temporary treatment unit and the substantive requirements of 22 CCR Division 4.5, Section 66264.553 for the design, operation, and closure of the temporary unit would be followed. After treatment, the treated sediment would be analyzed to determine whether it should be disposed of off-site, or could be reused on-site. The PCB regulatory limit for unrestricted use is 1 mg/kg in accordance with 40 CFR 761.61 (a)(4)(i). If the sediment is to be reused in non-ecologically sensitive areas at Moffett Federal Airfield after treatment, the PCB concentrations must be less than this limit. If sediment is to be reused at Site 25, PCB concentrations must be less than the selected RAO. It is noted that, for treated sediment to be reused at Site 25, metals concentrations must also be less than respective RAOs. However reuse of sediment in non-ecologically sensitive areas at Moffett Federal Airfield could potentially require less stringent limits on metals concentrations. Backfilling activities would be conducted in accordance with the Clean Water Act, Section 404 and the implementing regulations.

Alternatives 2 and 3 are considered acceptable from this aspect of the comparison, however, Alternative 2 is considered most favorable because it involves fewer ARARs, since onsite treatment is not required.

Long-Term Effectiveness and Permanence

Alternatives 2 and 3 both involve removing impacted sediments and replacing them with clean soil or

sediment, thereby reducing chemical concentrations to protective levels. In addition, both alternatives include maintaining the site to prevent chemicals from re-entering the site. These cleanup remedies are effective over the long term, and permanent. From this aspect of the comparison, Alternatives 2 and 3 are equally acceptable.

Short-Term Effectiveness

Alternatives 2 and 3 are both considered acceptable in the short term at reducing environmental exposure to impacted sediments with minimal effects to workers, the surrounding community, and the environment. The amount of sediment to be excavated and the associated re-vegetation effort would be the same for both alternatives, and therefore disturbances to plants and animals present at the site would nearly be equal. However because Alternative 3 requires treatment, overall implementation would take longer, and the risk to workers may be greater due to the additional sediment handling during treatment. Therefore, Alternative 2 is considered the most favorable with regard to short term effectiveness.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternatives 2 and 3 both specify removal of impacted sediments, and include provisions to prevent chemicals from re-impacting the sediment. Therefore, both alternatives will significantly reduce chemical mobility in the Eastern Diked Marsh and stormwater retention pond by reducing the potential for transport of chemicals by flowing water. While Alternative 2 does not involve treatment, Alternative 3 includes bioremediation of the sediments, which would potentially destroy PCB and DDT (metal concentrations would remain unchanged). Although the success of bioremediation is not known for these sediments, there is a potential with Alternative 3 for reduction of chemical toxicity and volume through treatment that does not exist with Alternative 2. From this aspect of the comparison, both alternatives are considered acceptable, but Alternative 3 is regarded as the most favorable.

Implementability

While both alternatives are expected to require some effort to implement, Alternative 2 would be easier to implement than Alternative 3. The technologies and equipment for the excavation portion of the alternatives is readily available, and the tasks involved do not present any major engineering difficulties. However, the treatment unit included in Alternative 3 would require extra effort to construct and maintain. In addition, because the bioremediation technology included in Alternative 3 is not proven for these sediments, a pilot test would be required to determine whether PCBs and DDT concentrations could be lowered to protective levels. If pilot test results indicate that this is not possible, then the sediments would require off-site disposal. In consideration of these issues, both Alternatives 2 and 3 are deemed acceptable. However, Alternative 2 is rated as the most favorable.

Cost

The estimated costs of Alternative 2 is \$2,562,800. The majority of costs are in the excavation and disposal of approximately 16,600 cubic yards of sediment, and importing of clean soil. The estimated cost of Alternative 3 is \$2,889,200. These costs mainly involve sediment excavation, biological treatment and disposal/reuse of approximately 16,600 cubic yards of sediment, and importing of clean cover soil. Depending on the success of the bioremediation, some of the disposal costs for Alternative 3 could potentially be reduced. Other costs (for both alternatives) include implementation of institutional controls, conducting revegetation monitoring to assure that the natural habitat is re-established, and the 5-year review. Costs associated with maintenance of the settling basin would be incurred by NASA (by agreement), and are not included here.

TABLE 3. Comparative Evaluation of the Remedial Alternatives

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Excavation and Off-Site Disposal	Alternative 3 Excavation, Ex-Situ Bioremediation, On-Site Reuse or Off-Site Disposal
Overall Protection of Human Health and the Environment	Not Protective	Acceptable	Acceptable
Compliance with ARARs	Not Evaluated	Most Favorable	Acceptable
Long-Term Effectiveness and Permanence	Not Evaluated	Acceptable	Acceptable
Short-Term Effectiveness	Not Evaluated	Most Favorable	Acceptable
Reduction of Toxicity, Mobility, or Volume through Treatment	Not Evaluated	Acceptable	Most Favorable
Implementability	Not Evaluated	Most Favorable	Acceptable
Cost	Not Evaluated	Most Favorable	Acceptable
State Acceptance <i>To be evaluated after the Public Comment Period</i>		
Community Acceptance <i>To be evaluated after the Public Comment Period</i>		

The cost for Alternative 2 is lower than that for Alternative 3. The higher cost of Alternative 3 is mainly associated with construction of a Corrective Action Management Unit, which would be necessary for sediment storage prior to and after bioremediation. From the cost aspect, Alternative 2 is regarded as the most favorable **cost-effective alternative**.

RATIONALE FOR CHOOSING THE PREFERRED ALTERNATIVE

Alternative 2 is recommended as the preferred alternative because it would meet the overall RAO (i.e., to limit exposure of ecological receptors to impacted sediments in the Eastern Diked Marsh and stormwater retention pond). This would be accomplished by reducing chemical concentrations to levels that are protective of non-piscivorous birds, which are expected to be the most sensitive ecological receptor at the site given site uses. The preferred alternative 1) reduces risk within a reasonable timeframe (months vs years), 2) meets ARARs from federal and state laws and regulations, 3) is less costly than Alternative 3, 4) provides the greatest short-term effectiveness, 5) provides for long-term reliability of the remedy, and 6) is more easily implemented (ability to complete without difficulty) than Alternative 3.

Based on the information available at this time, the U.S. Navy, U.S. EPA, and the RWQCB believe Alternative 2 would be protective of human health and the environment as summarized above, and would utilize permanent solutions to the maximum extent practicable. The preferred alternative may be modified in response to state and public comments or new information.

GLOSSARY OF TERMS

Specialized terms used in the Proposed Plan are defined below:

Administrative Record — all documents containing information the government uses to 1) select response actions, and 2) impose administrative sanctions for violations of CERCLA. This paper trail includes at a minimum: correspondence, the RI/FS, the Proposed Plan, the ROD, and public comments.

Applicable or Relevant and Appropriate Requirements (ARARs) — the federal and state regulations and standards that must be used at this site for this cleanup action.

Bioremediation — biological treatment of contaminated soil (or groundwater) using microorganisms to break down contaminants or

convert them to forms that are less toxic and/or mobile.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or Superfund) — a law that establishes a program to identify hazardous waste sites and establish procedures for cleaning up sites to be protective of human health and the environment, and evaluate damages to natural resources.

Cleanup — actions taken to deal with a release or threat of a hazardous substance that could affect people or the environment. The term "cleanup" is sometimes used interchangeably with the terms remedial action, remedy, or remediation.

Corrective Action Management Unit — a specialized facility constructed on-site for temporary consolidation, characterization, and storage of excavated sediments prior to treatment or disposal.

Cost-Effective Alternative — an alternative control or corrective method identified after analysis as the best available in terms of reliability, permanence, and economics. Although costs are an important consideration, when regulatory and compliance methods are being considered, the analysis does not require the Navy, U.S. EPA, and the RWQCB to choose the least expensive alternative.

DDT (p, p-dichlorodiphenyltrichloroethane) — Historically one of the most widely used chemicals for controlling insect pests on agricultural crops. Total DDT refers to a mixture of chemical forms of DDT, as well as several breakdown products. DDT can no longer be used as a pesticide in the United States except in cases of public health emergency.

Driving Risk — the most significant, or conservative risk at a site. It is assumed that elimination of the driving risk will also address any other risk that may be present.

Excavation — the physical removal of contaminated soils and sediments.

Exposure Pathways — the way a chemical or physical agent comes in contact with living organisms.

Ex-Situ Bioremediation — ex-situ is Latin for “out of place”. Bioremediation generally refers to the use of naturally occurring bacteria to break down or degrade organic contaminants such as fuel products or solvents. Therefore, ex-situ bioremediation involves the excavation, or moving of soil from one place to another for biological treatment to clean it up.”

Federal Facility Agreement (FFA) — an agreement signed by the Navy, the U.S. EPA, the RWQCB, and the DTSC that sets forth the actions and schedule under which the Navy will address environmental contamination at Moffett Field.

Feasibility Study (FS) — a study to identify, screen, and compare alternatives for a site cleanup.

Institutional Controls — restrictions on land use that limit activities, such as building or drilling wells. Institutional Controls are implemented through codes, regulations or legal documents that follow ownership of the land.

Lead Agency — federal agency responsible for performing the cleanup work, including the remedial investigation, feasibility study, and the construction and operation of the remedy. The lead agency works under the regulatory oversight of the U.S. EPA. The Navy is the lead agency at this site.

National Oil and Hazardous Substance Pollution Contingency Plan (NCP) — the basic regulatory directive for federal response actions under CERCLA.

Piscivorous — feeding on fish.

Polychlorinated biphenyls (PCBs) — a chemical formerly used as a dielectric fluid in transformers and capacitors to keep them cool.

Preferred Alternative — the remedial alternative selected by the lead agency, in conjunction with the support agencies, that best satisfies the remedial action objective, based on the evaluation of alternatives presented in the feasibility study.

Proposed Plan — a document that reviews the cleanup alternatives presented in the feasibility study, summarizes the recommended cleanup actions, explains the reasons for recommending them, and solicits comments from the community.

Record of Decision (ROD) — a decision document that identifies the cleanup alternative chosen for implementation at a Superfund site. The ROD is based on information from the remedial investigation and feasibility study and on public comments and community concerns.

Receptor — a representative human or animal that is used in evaluating health risks. For example, when evaluating the human health risks for an occupational scenario, a construction worker is the hypothetical receptor.

Regional Water Quality Control Board (RWQCB) — a state of California environmental regulatory agency supporting the U.S. EPA with oversight of environmental activities at Moffett Field.

Remedial Action Objective (RAO) — the objective that the proposed site cleanup is expected to accomplish.

Remedial Investigation (RI) — an investigation during which the types, amounts, and locations of contamination at a site are identified.

Risk Assessment — an analysis of the potential negative human health and environmental effects caused by hazardous substances released from a site without environmental controls.

Sediment — unconsolidated particles which are created by the weathering and erosion of rock, by chemical precipitation from solution in water, or from the secretions of organisms, and are transported by water, wind, or glaciers.

Semivolatile Organic Compound (SVOC) — organic compounds (carbon-containing), such as certain oils and pesticides, that do not evaporate readily at room temperature.

Settling Basin — a basin, or lined pond, through which sediment-laden water flows, and sediments settle out and are thus removed from the flowing water.

Superfund — the common name for CERCLA, which was a law passed in 1980 that set forth the process for investigation and cleanup of environmentally contaminated sites. Refers to a fund of dollars via a tax on oil and gas industries.

Threatened and endangered species — an “endangered” species is one that is in danger of extinction throughout all or a significant portion of its range. A “threatened” species is one that is likely to become endangered in the foreseeable future.

Total Petroleum Hydrocarbon (TPH) — organic compounds that are either fuel or components of fuel.

U.S. Environmental Protection Agency (U.S. EPA) — the lead federal regulatory agency providing oversight of the environmental activities at Moffett Field.

Volatile Organic Compound (VOC) — organic compounds, such as dry-cleaning solutions or degreasing solvents, that evaporate readily at room temperature.

COMMUNITY PARTICIPATION

The Navy, U.S. EPA, and the RWQCB provide information regarding the cleanup of Site 25, Eastern Diked Marsh and stormwater retention pond to the public through public meetings, the Administrative Record file for the site, and announcements published in the San Jose *Mercury News* and local community newspapers. The Navy, U.S. EPA, and the RWQCB encourage the public to gain a more comprehensive understanding of the site and the CERCLA activities that have been conducted at Moffett Federal Airfield. The dates for the public comment period and the date, location and time of the public meeting are provided on the front page of this Proposed Plan.

There are two ways for you to provide your comments during the public comment period between July 23, 2001 and August 22, 2001. You may use the comment form included with this Proposed Plan to send written comments to the address listed below.

Also, you may submit your written or oral comments during the public meeting on August 16, 2001 at the Mountain View City Council Chambers. A stenographer will be at the meeting to record public comments.

After the public comment period is over, the Navy, U.S. EPA, and RWQCB will review and consider the submitted comments in making a final decision on the remedial action alternative to be used at Site 25. All site-related documents are available for review in the Information Repository at the following location.

**Mountain View Public Library
585 Franklin Street
Mountain View, California 94041**

**Hours:
Monday - Thursday 10 a.m. to 9 p.m.
Friday and Saturday 10 a.m. to 6 p.m.
Sunday 1 to 5 p.m.**

RESPONSIVENESS SUMMARY

The Navy will respond to all formal comments received on the Site 25 Proposed Plan in a document called a Responsiveness Summary. The Responsiveness Summary will be mailed to all individuals who provide comments during the public comment period from July 23, 2001 through August 22, 2001. It will also be placed in the information repository at the Mountain View Public Library.

FOR MORE INFORMATION

If you have any questions about Moffett Federal Airfield Site 25, Eastern Diked Marsh and stormwater retention pond, please contact:

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